

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
12 May 2005 (12.05.2005)

PCT

(10) International Publication Number
WO 2005/043188 A1

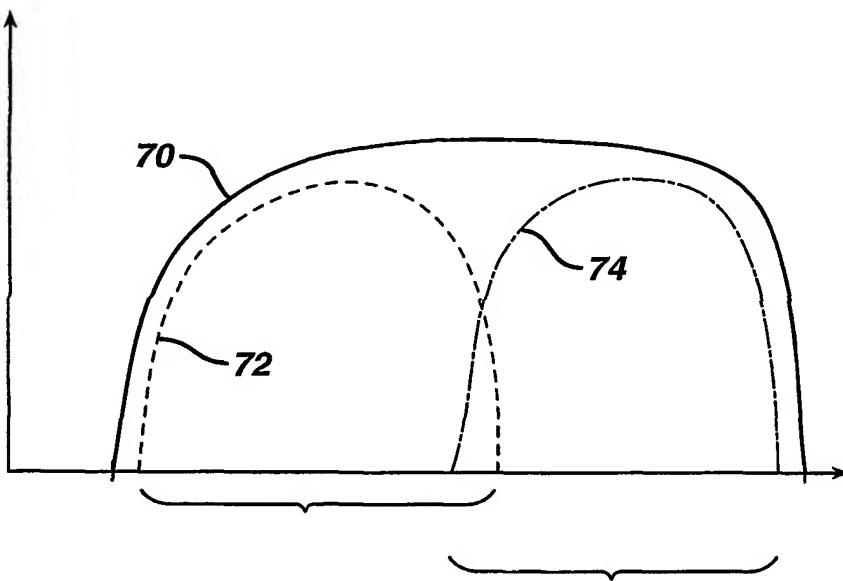
- (51) International Patent Classification⁷: **G01S 15/89**, G10K 11/34
- (21) International Application Number: **PCT/IB2004/003569**
- (22) International Filing Date: 1 November 2004 (01.11.2004)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data: 60/517,151 3 November 2003 (03.11.2003) US
- (71) Applicant (for all designated States except US): **KONINKLIJKE PHILIPS ELECTRONICS, N.V. [NL/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).**
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): **NG, Gary [US/US]; P.O. Box 3003, Bothell, Washington 98041-3003 (US).**
- (74) Common Representative: **KONINKLIJKE PHILIPS ELECTRONICS, N.V.; c/o W. Brinton Yorks, Jr., P.O. Box 3003, Bothell, WA 98041-3003 (US).**
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ,

[Continued on next page]

(54) Title: ULTRASONIC MULTIPLE BEAM TRANSMISSION USING SINGLE CRYSTAL TRANSDUCER



WO 2005/043188 A1

(57) Abstract: An ultrasonic imaging system uses a wide bandwidth transducer to transmit multiple simultaneous beams. The beams occupy different frequency bands of the transducer bandwidth and are steered in different beam directions. The received beams are separated by bandpass filters tuned to the different frequency bands. If the different frequency bands overlap, cross-talk between the two beams may be reduced by using coded pulses for the transmit beams and matched filters to separate the received echo signals of the simultaneous beams. a single crystal transducer is used as the wide bandwidth transducer.



CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE,
EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS,
JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA,
MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM,
PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ,
TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM,
ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, NA,
SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ,
BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE,
BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU,

IE, IS, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI
patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML,
MR, NE, SN, TD, TG)

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.